

## HIGH RESOLUTION DYNAMICS LIMB SOUNDER

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Subject/Title: **HIRDLS Acronyms, Abbreviations, Dictionary of Terms  
and Optical System Terminology**

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## **CHANGE LOG** (since previous rev.)

### **New: (added to Part I)**

ATBD	Algorithm Theoretical Basis Document
CCH	cooler cryo heads
CCM	cooler compressor mechanisms
CSTOL	Colorado System Test & Operations Language
IMP	instrument microprocessor [used in IRD]
LMIRIS	Lockheed Martin InfraRed Imaging Systems [pronounced: "LIRIS" (!)]
LM	Lockheed Martin Corp.
LMATC	Lockheed Martin Advanced Technology Center [Palo Alto]
MEM	Modified Engineering Model
OASIS	Operations & Science Instrument Support
PFM	proto-flight model
POCC	Payload Operations Control Center
SAIL	Science Algorithm Implementation Language
SNR	signal to noise ratio
SRCF	spacecraft reference co-ordinate frame
SWAMP	Software Acquisition Management Plan
TRCF	telescope reference co-ordinate frame
VIFOV	vertical instantaneous field of view
w/n	wavenumber [ $\text{cm}^{-1}$ ]

### **Deleted from Part I:**

ROM	read-only memory
ORCF	observatory/orbital reference coordinate frame

### **Corrections and changes to Part I:**

CMU	cooler mechanical unit [originally: chopper mechanical unit]
TQCM	temperature-controlled quartz crystal micro-balance

### **New Part II; subsequent parts re-numbered**

Part II is a new section containing some of the acronyms, etc. which were deleted from the original list compiled by DMW and JGW, and which have been re-instated as a useful reference source. The existing Parts II, III and IV have been re-numbered III, IV and V respectively.

### **Corrections and changes to Part III:**

Cold Node	ADDED
Cold Rod adaptor	ADDED
Cryo Head(s)	DELETED
Displacer	ADDED
Flexible Bellows	DELETED
Flexible Vacuum Enclosure	ADDED

## Part I

### Approved Acronyms and Abbreviations used by the HIRDLS Project.

ACD	Atmospheric Chemistry Division (of NCAR)
ANSI	American National Standards Institute
ATBD	Algorithm Theoretical Basis Document
AR	anti-reflection
ATP	acceptance test procedure
ATS	acceptance test station
BB	black body
BCU	bench check(out) unit
BEU	Black-Body Electronics Unit
BOL	beginning of life
C&TH	Command & Telemetry Handbook
CCH	cooler cryo heads
CCM	cooler compressor mechanisms
CCP	contamination control plan
CCU	cooler control unit
CDRL	contract document requirements list
CEU	chopper electronics unit (obsolete, see TEU)
CFA	cold filter assembly
CHEM	Chemistry Platform
CIFOV	composite instantaneous field of view
CMU	cooler mechanical unit
CSCI	computer software configuration item
CSS	Cooler Subsystem [see Glossary]
CSTOL	Colorado System Test & Operations Language
D*	detectivity @ peak sensitivity wavelength
DIT	differential impedance transducer
DLS	Dynamics Limb Sounder
DSS	Detector Subsystem [see Glossary]
EGSE	electrical ground support equipment
EM	engineering model
EOL	end of life
ESD	electrostatic discharge
FEM	finite element model

FM	flight model
FME(C) A	failure modes and effects ( & criticality) analysis
FOR	field of regard
FOV	field of view
FPA	focal plane assembly
FWHM	full width at half maximum
GEU	Gyroscope Electronics Unit
GEVS	general environmental verification specification
GIRD	General Interface Requirements Document
GMU	Gyroscope Mechanical Unit
GSE	ground support equipment
GSS	Gyroscope Subsystem [see Glossary]
HIRDLS	High Resolution Dynamics Limb Sounder
HIRRLS	High Resolution Research Limb Sounder
IAC	interface alignment cube (for instrument-s/c alignment)
ICD	interface control document
IDD	instrument description document
IFC	In-flight Calibrator (calibration) Subsystem [see Glossary]
IFOV	instantaneous field of view
IGSE	instrument ground support equipment
IICD	internal interface control document
ILOS	instantaneous line of sight
IMGSE	instrument mechanical ground support equipment
IMP	instrument microprocessor [used in IRD]
IP	Instrument Processor (used in SPRAT)
IPU	Instrument Processor Unit (part of IPS)
IPS	Instrument Processor Subsystem [see Glossary]
IRCF	instrument reference coordinate frame
IRD	Instrument Requirements Document
ISAMS	Improved Stratospheric and Mesospheric Sounder
ITGSE	instrument thermal ground support equipment
ITS	Instrument Technical Specification
IWG	Investigators Working Group
LIMS	Limb Infrared Monitor of the Stratosphere
LIRIS	Loral Infrared and Imaging Systems [old]
LMIRIS	Lockheed Martin InfraRed Imaging Systems [pronounced: "LIRIS" (!)]
LM	Lockheed Martin Corp.
LMATC	Lockheed Martin Advanced Technology Center [Palo Alto]

LMMS	Lockheed Martin Missiles & Space
LOE	level of effort
LOS	line of sight
LRIR	Limb Radiance Inversion Radiometer
LVDT	linear variable differential transformer
MEM	modified engineering model
MGSE	mechanical ground support equipment
MMS	Matra Marconi Space
MOI	moment of inertia
MSS	Matra Marconi Space (formerly Marconi Space Systems)
NEA	noise equivalent angle
NEN	noise equivalent radiance
NEP	noise equivalent power
OASIS	Operations & Science Instrument Support
OB	optical bench
OBA	optical bench assembly
OGSE	observatory ground support equipment
OOF	out of field
OSS	Optical Subsystem (obsolete)
PCU	power converter unit
PEA	preamplifier electronics assembly
PFM	proto-flight model
POA	projected optical axis
POCC	Payload Operations Control Center
PRT	platinum resistance thermometer
PSD	power spectral density
PSS	Power Subsystem [see Glossary]
QCM	quartz crystal micro-balance
RRP	relative response point
RTOS	real-time operating system
RVDT	rotary variable differential transformer
SAIL	Science Algorithm Implementation Language
SAS	system aperture stop
S/C	spacecraft

SIDS	simulated instrument data set(s)
SMA	scan mirror assembly
SMA	subminiature A-type [see MIL-C-39012]
SMRC	spacecraft master reference cube
SMU	scanner mechanical unit
S/N	signal to noise (ratio)
SNR	signal to noise ratio
SPRAT	System Performance Requirements and Allocations Tables
SPU	signal processing unit (part of IPS)
SRCF	spacecraft reference co-ordinate frame
SRD	Science Requirements Document
SSA	sun shield assembly (see also SSH)
SSD	Subsystem Specification Document
SSH	Sunshield Subsystem [see Glossary]
STH	Structure/Thermal Subsystem [see Glossary]
SVA	Space View Aperture [subassembly]
SWAMP	Software Acquisition Management Plan
SWAMP	Science Working group for the AM Platform
T&C(F)	test & calibration (facility)
TAI	international atomic time
TC	technical communication (report)
TCG	Technical Coordination Group
TGSE	thermal ground support equipment
TML	total mass loss
TMM	thermal mathematical model
TQCM	temperature-controlled quartz crystal micro-balance
TRCF	telescope reference co-ordinate frame
TSS	Telescope Subsystem [see Glossary]
UIID	Unique Instrument Interface Document
VIFOV	vertical instantaneous field of view
VSR	vertical spatial response
WBS	work breakdown structure
w/n	wavenumber [ cm <sup>-1</sup> ]
WP	work package

## Part II

### Other Recognised Acronyms and Abbreviations

ACRIM	Active Cavity Radiometer Irradiance Monitor
ADS	angular displacement sensor
AIRS	Atmospheric Infrared Sounder
BACG	Ball Aerospace & Cryogenics Group
BAe	British Aerospace
BEI	Baldwin Electronics Inc. [this is historical; now just BEI]
BLIP	background limited performance
BS	boresight / bullshit / British Standard
CAL	code used in ITS to denote "Calibration facility" as virtual subsystem
CCD	charge coupled device
CCCP	Union of Soviet Socialist Republics [superseded]
CDCR	conceptual design and cost review
CDR	critical design review
CFE	customer furnished equipment
CFRP	carbon fiber reinforced plastic
CIL	critical items list
Co-I	co-investigator
CPAF	cost plus award fee
CPFF	cost plus fixed fee
CPT	comprehensive performance test
CPU	central processor unit
CRC	cyclic redundancy code
CSSA	cold stop subassembly
CTU	command and telemetry unit
CVCM	collected volatile condensable mass
DDA	detector/dewar assembly
DID	data item description
DLV	diffraction limited value
DSR	design status review
EEE	electrical, electronic and electromechanical
ELV	expendable launch vehicle
EMC	electromagnetic compatibility
EMI	electromagnetic induction/interference
EOS	Earth Observing System
ESA	European Space Agency
EXT	code used in ITS to denote "external (i.e. spacecraft) subsystems"
FOR	flight operations review [see also Part I]
FRR	flight readiness review

FS	field stop
FSA	filter subassembly
GEA	General Electric Astrospace Division
GEC	General Electric Company UK
GFE	government furnished equipment
GIDEP	Government-Industry Data Exchange Program
GIIS	General Instrument Interface Specification [refers to EOS-AM only]
GSFC	Goddard Space Flight Center
HgCdTe	mercury-cadmium-telluride
HLV	heavy lift vehicle
IMP	instrument micro-processor
IMU	inertial mechanical unit
IR	infrared
IRU	inertial reference unit
ISRR	instrument & subsystems requirements review
JPL	Jet Propulsion Laboratory
LMSC	Lockheed Missiles & Space Company
LSB	least significant bit
ISMARD	Instrument Software Management Requirements Document
MLI	multi layer insulation
MLS	Microwave Limb Sounder
MOPITT	Measurements of Pollution in the Troposphere
MOR	mission operations review/room
MRB	material review board
MSB	most significant bit
MSFC	Marshall Space Flight Center
MTF	modulation transfer function
MTM	mechanical test model
NASA	National Aeronautics and Space Administration
NASTRAN	NAsa STRuctural ANalysis
NCA	National Center for Atmospheric Research
NCAR	National Center for Atmospheric Research
NHB	NASA Handbook
NSF	National Science Foundation
ORC	optics reference cube (internal, mounted on OB)
OTF	optical transfer function
OXF	Oxford University
PAIP	performance assurance implementation plan
PAR	performance assurance requirements
PCP	parts control plan
PDR	preliminary design review
PE(T)R	pre-environmental (test) review
PI	principal investigator
PMP	payload mounting plate
POS	performance and operation specification
PPL	preferred parts list
PRCS	pointing reference coordinate system
PSR	pre-shipment review
PSU	[s/c] power switching unit (term "power supply unit" to be avoided)



QA	quality assurance
QC	quality control
RAD	requirements allocation document
RAL	Rutherford Appleton Laboratory
RAM	random access memory
RDU	Reading University
RFP	request for proposal
ROM	read-only memory / rough order of magnitude
RSS	root sum squared
RTG	Reduced Technical Group / radioisotope thermal generator
RWA	reaction wheel assembly
SAMS	Stratospheric and Mesospheric Sounder
SBRC	Santa Barbara Research Center (Hughes)
SCDR	subsystem critical design review
SCR	system concept review
SDU	scan drive unit
SEU	single event upset / scanner electronics unit
SI	Système International / system integrator
SINDA	systems improved numerical differencing analyzer
SOLSTICE	Solar Stellar Irradiance Comparison Experiment
SOW	statement of work
SPDR	subsystem preliminary design review
SRR	system requirements review
SSCR	sub-system concept review
SSG	Sensor Systems Group
SSST	solid state star tracker
STR	system test review
STS	Space Transportation System
TBD	to be determined
TBI	to be invented
TBS	to be specified
TBV	to be verified
TDRSS	Tracking and Data Relay Satellite System
TIR	thermal infrared
TO	technical officer
TRASYS	thermal radiation analyzer system
TRW	Thompson, Ramo, Wooldridge
UARS	Upper Atmosphere Research Satellite
UCAR	University Corporation for Atmospheric Research
UK	United Kingdom
US	United States
UT	universal time
UTC	universal time, coordinated
VBA	verify by analysis
VBI	verify by inspection
VBt	verify by test
WOM	write only memory
WR	work request

## Part III

### Glossary of HIRDLS Terms

Note: Where relevant, the following descriptions include statements relating to the provider and end use of the item to eliminate confusion between similarly-named items

Albedo Shield	That part of the Space View optical baffle assembly which is attached to the OUTSIDE face of the Outer Structure (part of the STH subsystem)
Black-Body Electronics Unit (BEU)	Part of the IFC Subsystem
Cold Node	The interface between the CSS and DSS where performance is specified.
Cold Link	The thermal link which connects the Displacer Cold Tip to the Detector Dewar Cold Rod. This consists of the S-Link, and the adaptors at each end
Cold Rod adaptor	The adaptor on the DSS side of the Cold Node interface is designed by Ball, fabricated by (?), and installed by LMIRIS.
Cooler	A balanced Compressor assembly, and a Displacer assembly with internal balance mechanism
Cooler Assembly	A Cooler, Mounting Brackets, Cryovac Housing, Cold-Link/Flexible Bellows assembly, and Radiator Panels
Cooler Control Unit (CCU)	The electronics unit containing the Cooler drive, control, NB switching (TBV), and power conditioning electronics
Cooler Subsystem (CSS)	Cooler Assembly and Cooler Control Unit (CCU).
Cryovac Housing	The rigid part of the vacuum enclosure mounted to the Displacer that interfaces with the Flexible Vacuum Enclosure, and Vacuum Port.
Detector Subsystem (DSS)	Detector Dewar Assy, including Cold Filters, Cold Shield, getters, Window and Cold Rod; and Preamplifier Electronics Assembly (PEA); supplied by LMIRIS, with filters from Reading University (UK)
Displacer	Displacer assembly with internal balance mechanism.
Drill Template	A master to be used by MMS for drilling the mounting holes in the HIRDLS instrument Mounting Feet, and by the S/C contractor for drilling the HIRDLS mounting holes in the spacecraft; see NASA-GSFC-422-36-02, April 1995, NASA HIRDLS Specification, Section 9.6; see also GIRD para. 3.4.5; supplied by MMS [may be 1 item or two similar (identical?) items - TBD]
Flexible Vacuum Enclosure	The part of the vacuum enclosure surrounding the Cold Link. It includes a pair of flexible bellows, an elbow with 45 degree split for access, and snubbers
Gyro Electronics Unit (GEU)	Contains the GSS (incl. magnetometer) electronics
Gyro Mechanical Unit (GMU)	Contains the GSS mechanical units and magnetometer sensors
Gyro Subsystem (GSS)	GMU + GEU
IFC (In-Flight Calibration) Subsystem	Black-body and BEU
Inner Baffle	That part of the Space View optical baffle assembly which is attached to the Optical Bench
Instrument Container	That piece of IMGSE comprising the main instrument shipping and transportation container; one each will be provided for the EM and PFM; each will be purged using a Purge Panel

Instrument GSE (IGSE)	All items of Electrical GSE which accompany each of the two HIRDLS instrument models following integration; supplied by OXF
Instrument Harness	The ensemble of ALL wiring harnesses and cables; to be supplied by LMMS (including intra-s/s cables); WBS element AAGF; currently shown in IICD SP-HIR-200 as two separate entities: Instrument Signal Harness (item # 702) and Instrument Power Harness (item # 902); supplied by LMMS
Instrument Mechanical GSE (IMGSE)	All items of MGSE which accompany each of the two HIRDLS instrument models; deliverable with the STH subsystem; supplied by MMS
Instrument Mount	May be used [TBD] for HIRDLS; if used, will be supplied by the S/C contractor; see GIRD para. 3.4.3; attached between each MOUNTING FOOT and the S/C
Instrument Processor Subsystem (IPS)	IPU + SPU + Instrument Signal Harness [see INSTRUMENT HARNESS above]; supplied by LMMS
Instrument Processor Unit (IPU)	The electronics unit containing all the IPS electronics except the signal processing circuits
Instrument Thermal GSE (ITGSE)	All items of TGSE which accompany each of the two HIRDLS instrument models; used for cooling radiator panels, etc. to keep instrument within desired temperature limits during air-testing; supplied by OXF [note - ITGSE does not include the hot and/or cold [TBD] bench-test/S/C-test radiometric targets; these form part of the RGSE to be supplied by LOC.
Lifting Frame	That piece of IMGSE used to lift the instrument with the latter in one of 3 orientations, viz: +Z, +X or -X uppermost; attaches to the instrument mounting foot side-webs; when in use the Lifting Frame is suspended from an overhead hoist; the Primary Handling Fixture may or may not be attached to the instrument; one each will be provided for the EM and PFM; supplied by MMS
Mounting Feet	Those parts of the HIRDLS instrument which protrude from the Baseplate, and to which the Mounts are attached
Optical Bench Assembly	Includes: Optical Bench Structure, Component Mounts (including Warm-Filter Carrier), Optical Bench/Baseplate Mounts, Optics Reference Cube, Heaters and Sensors, and Optical Bench Retroreflectors. (Also is WBS element AACA in its entirety.)
Outer Baffle	That part of the Space View optical baffle assembly which is attached to the INSIDE face of the Outer Structure (part of the STH subsystem)
Power Converter Unit (PCU)	The electronics unit containing the instrument power converter circuits and all other PSS electronics [note - the acronym PSU not used here, to avoid confusion with a possible S/C "Power Switching Unit"]
Power Subsystem (PSS)	Now synonymous with PCU
Preamplifier Electronics Assembly	Part of Detector Subsystem
Primary Handling Fixture	That piece of IMGSE to which the instrument is rigidly attached for shipping and handling; it interfaces with the instrument mounting feet and with other handling fixtures; see NASA-GSFC-422-36-02, Apr '95, NASA HIRDLS Specification, Section 4.5.6 & 9.4; one each will be provided for the EM and PFM; supplied by MMS

Purge Panel	That piece of IMGSE used to control, filter and monitor the flow of nitrogen gas to the HIRDLS instrument, except when packed in the Instrument Container, or to the Instrument Container itself; one each will be provided for the EM and PFM; supplied by MMS
Radiometric GSE (RGSE)	Hot and/or cold [TBD] bench-test/S/C-test radiometric targets; supplied by LOC [see under HIRDLS WBS #ABD]
Signal Processor Unit (SPU)	The electronics unit (part of the IPS) containing the detector signal processing circuits
Space View Aperture Assy (SVA)	Consists of the Space View OUTER BAFFLE and the Closure Mechanism; attached to the Cooler Radiator Panel, which is part of the STH; for management purposes the SVA is combined with the SSH, but for interface control purposes the SVA is considered part of the STH.
"SSG" Assembly	This assembly is the hardware that Sensor Systems Group, Inc. (SSG) provides to Lockheed Martin for the HIRDLS program. This term was created to avoid the misconceptions that SSG is providing either the Optical Bench Assembly, or the TSS. The SSG-Assembly includes most of the Optical Bench Assembly, most of the Optical Elements, and the Scanner Mechanical Unit (with some electronics to support the encoders). See "TSS Breakdown - Rev B" (Part IV) for clarification.
Structure/Thermal Subsystem (STH)	The HIRDLS instrument Outer Structure, comprising Baseplate, Radiator Panels, Outer Housing, Mounting Feet, Fixed Sunshield, MLI, etc.; see also above item (SVA); supplied by MMS
Sunshield Subsystem (SSH)	Comprises Moving Sunshield components and associated drive and sensor components; mounted on Outer Structure; supplied by MMS; SSH electronics is supplied by LMMS and packaged in IPU
Telescope Electronics Unit (TEU)	The electronics unit containing the Chopper control and drive electronics, Scanner control and drive electronics, Calibration Mirror thermal control electronics, and Lens thermal control electronics. Note that it does not include the other thermal control electronics — those are in the Instrument Processor Unit (IPU)
Telescope Subsystem (TSS)	Consists of Optical Bench, telescope optical system (including calibration & space-view mirrors, Chopper, Scanner, anti-vibration mounts and Launch Locks, optical baffles, Warm Filters; supplied by LMMS, with filters from Reading University. See "TSS Breakdown - Rev B" (Part IV) for clarification.
Turnover Stand	That piece of IMGSE used to rotate the instrument while attached to the Primary Handling Fixture (PHF); interfaces with the PHF; when in use the Turnover Stand is resting on the floor; one each will be provided for the EM and PFM; supplied by MMS

## Part IV

### Optical System Terminology

Item	Primary Designation	Secondary Designation and/or Comment
Scan Mirror Assembly	SMA	
Scan Mirror	FM0	Flat
"Primary" mirror	M1	Paraboloid
"Secondary" mirror	M2	Ellipsoid
Chopper	FM3	Flat
Plane Folding Mirror	FM4	Flat
Space View Mirror	M5	Toroid
IFC mirror	M6	Paraboloid
Dewar Window	W1	Flat
Warm filters	WF1 thro' 21	
Cold filters	CF1 thro' 21	
Cold Shield	CLDSH	
Primary Field Mask	PFM	FS1
Secondary Field Mask	SFM	FS2 (21 apertures)
Primary Diffraction Baffle	PDB	AS1
Intermediate Lyot Stop	ILS	AS2
System Aperture Stop	SAS	AS3
Ge Lens 1	L1	
Ge Lens 2	L2	
Space View Port	SPVUPT	
Space View Field Stop	SPVUFS	
Space View Aperture Stop	SPVUAS	
Space View Baffle 1	SPVUB1	Inner Baffle
Space View Baffle 2	SPVUB2	Outer Baffle
Space View Aperture assy	[see glossary]	

Part V

“TSS Breakdown- Rev C”

